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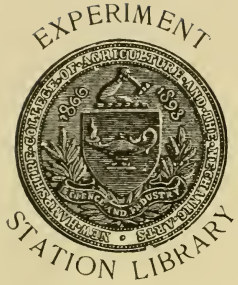

Class 639.73

Number N53

Volume 3 cop 2

Source Binding

Received July 1909

Cost

Accession No. 15435

Bulletin 98 February, 1903

NEW HAMPSHIRE COLLEGE

AGRICULTURAL EXPERIMENT STATION

THE

Inspection of Feeding-Stuffs

IN 1902

IN COÖPERATION WITH THE STATE BOARD OF AGRICULTURE

NEW HAMPSHIRE COLLEGE

OF

AGRICULTURE AND THE MECHANIC ARTS

DURHAM

COMPOSITION OF COMMON CATTLE FOODS.

	Water.	Ash.	Protein.	Soluble Carbohydrates.	Fibre.	Fat.
* Hay, red top	8.9	5.2	7.9	47.4	28.6	1.9
* Hay, Timothy	13.2	4.4	5.9	45 0	29.0	2.5
* Hay, clover	15.3	6.2	12.3	38.1	24.8	3.3
* Hay, Hungarian	7.7	6.0	7.5	49.0	27.7	2.1
* Oat fodder	8.9	6.2	7.6	45.1	29.3	2.8
* Rye fodder, in bloom.	8.5	5.9	9.7	43.4	30.2	2.3
* Corn stover	40.1	3 4	3.8	31.9	19.7	1.1
† Corn silage	80.5	1.5	1.6	10.0	5.8	.6
* Corn, N. H. Flint	10.1	1.5	11.6	70.2	1.1	5.5
* Corn meal	15.0	1.4	9.2	68.7	1.9	3.8
* Oats, whole	11.0	3.0	11.8	59.7	9.5	5.0
† Oat feed	5.5	4.1	7.5	70.3	9.8	2.8
§ Wheat bran, spring	10.6	6.0	16.3	53.0	9.4	4.7
§ Wheat bran, winter	11.7	5.9	15.2	54.8	8.5	3.9
¶ Wheat middlings	10.3	3.3	19.0	57.7	4.6	5.1
¶ Gluten feed	8.6	1.2	26.3	53.4	6.9	3.6
¶ Gluten meal	8.8	.7	35.5	50.3	1.6	3.1
¶ Linseed meal, new process	10.1	5.8	33.2	38.4	9.5	3.0
¶ Cottonseed meal	6.9	7.2	45.6	25.1	5.6	9.6

* Composition of American Feeding Stuffs. Jenkins and Winton.
† Analyses made at the N. H. Expt. Sta., 1895-1899.
§ Penn. Expt Sta. Bull. 48.
¶ Compiled from Feed Inspection Reports and Comp. Am. Feeding Stuffs.

THE INSPECTION OF FEEDING STUFFS.

1902.

The state legislature of 1901 passed an act to regulate the sale of concentrated commercial feeding stuffs.

The points of the law of most interest to the consumer are concisely stated below.

Kinds of Feed coming within the Law. The law applies to all feeding stuffs except hays and straws; whole seeds and meals of wheat, rye, barley, oats, Indian corn, buckwheat, and broom corn; brans and middlings. The principal feeds coming under the provisions of the law are linseed meals, cottonseed meals, pea meals, cocoanut meals, gluten meals, gluten feeds, maize feeds, starch feeds, sugar feeds, dried brewers' grains, malt sprouts, hominy feeds, cerealine feeds, rice meals, oat feeds, corn and oat chops, ground beef or fish scraps, mixed feeds, and all other materials of similar nature.

The Brand. Each package of feeding stuff included within the law shall have affixed, conspicuously printed, the following statements:

The number of net pounds contained in the package.

The name or trademark under which it is sold.

The name of the manufacturer or shipper.

The place of manufacture.

The place of business of manufacturer or shipper.

The percentage of crude protein.

The percentage of crude fat.

These statements may be printed directly on the bag, or on a tag attached to the package.

Analysis. The secretary of the Board of Agriculture is required to collect and analyze each year at least one sample of each of the brands of feeding stuffs coming within the provisions of the act, and publish the results, together with related matter, from time to time.

The percentages of protein and fat are required because these two constituents are the most expensive to purchase and are least liable to be produced in sufficient amount in home-grown fodders.

Protein is made up of a number of substances which contain nitrogen as a distinguishing element. They occur in all the cells of both plant and animal organisms. In plants, protein is most abundant in the cells of new shoots, leaves, and the germs of seeds, and in animals it forms the muscles, tendons, and connective tissues, the clotted part of blood, and the curd of milk. Plant protein is the sole source of animal protein in our herbivorous animals, and is indispensable for making growth and milk, and also maintaining an animal in condition for work.

Fat, as it exists in plants, is almost always oily in consistency. It is most abundant in the seeds, where it is a source of energy to produce activity in the germ as soon as the seed begins to sprout. In the animal, fat is stored in the tissues to furnish a reserve of material for keeping the body warm and producing energy for work. Much of the fat in the food is at once used for these two purposes, and only a surplus is stored.

Besides protein and fat, cattle foods contain a group of substances called carbohydrates, of which sugar, starch, and gum are well-known types. Such carbohydrates are soluble in ordinary chemical reagents and usually readily digested by the animal. They occur in the cells of various parts of plants, and are most abundant in seeds, tubers, and tuberous roots. They furnish the energy for plant activity and the material out of which to build the walls of new cells. Carbohydrates in foods do the same work in the animal that is done by fat, and can be transformed into fat. They are not as concentrated as fat, one pound of fat containing as much energy as two and one fourth pounds carbohydrates. In addition to the soluble starch, sugar, and gum, plants contain an insoluble carbohydrate cellulose, which forms the cell walls or frame of the plant. Cellulose, together with insoluble gum, forms the fiber of plants, so expressed in all analyses of plants and foods.

From the table of common feeding stuffs it will be seen that the foods which are richest in protein are those residues of seeds or grains from which either oil or carbohydrates have been removed. For example, cottonseed meal is the meat of the cotton seed from which the oil has been extracted, and gluten feed is the remnant of the corn kernel after starch has been removed. Such foods have little fiber and a moderate proportion of soluble carbohydrates. They may or may not be richer in oil than common fodders.

The home-grown fodders, consisting of whole plants, are, as a rule, high in fiber, and low in protein and fat with a moderate proportion of soluble carbohydrates. The grains contain much more carbohydrates, with a little more protein and fat than the fodders. Corn meal and oat feed are inferior to the whole grains in composition, because the best grades of corn and oats are sold unground.

In the by-products from wheat, viz., bran and middlings, we have the portions of the grain which are richest in protein and fat, but for human foods they are made unsuitable by the larger proportion of fiber accompanying the other constituents.

Although winter bran usually sells for a higher price than spring, it will be noted that its composition is a little inferior in both protein and fat. This is borne out by numerous analyses.* Digestion experiments show practically no difference† in the rate of digestibility of the varieties, and consequently there is no reason why one should purchase winter bran in preference to spring bran.

Wheat middlings vary considerably in composition and value. In general, so far as recorded analyses can show, brown middlings have more fiber and less soluble carbohydrates than the average, while flour middlings contain more of the latter and less of the former. The protein content will average about alike for the two grades. Mixed feed is made up from both bran and middlings, and consequently has a composition varying between those of the other two.

In purchasing feeding stuffs one should carefully consider

* Pa. Expt. Sta. Bull. 48. N. J. Expt. Sta. Bull. 160.

† Digestibility of American Feeding Stuffs.—Jordan and Hall.

what kinds he can grow and what animal products he wishes to produce. Growing animals and milch cows require more protein in their food than fattening animals, because flesh and milk contain much protein, while fat is produced from fat and carbohydrates. If one has on hand both coarse fodder and home-grown grains, he is most concerned to get a supply of protein. If he has only coarse fodders, fat in addition to protein will be advantageous, while, as is sometimes the case, if the stock of hay is short, it may be well to buy the low priced by-products containing high percentages of soluble carbohydrates with as little fiber as possible.

In a few instances so-called oat feeds have been sold in our state which were nothing but finely ground hulls. A sample received from Littleton before the passage of the law contained but 2.6 per cent. of protein and over 26 per cent. of fiber. The branding of such materials with a guaranteed amount of protein and fat will enable purchasers to avoid them or to buy them at prices proportionate to their composition.

In accordance with the law, the secretary of the State Board of Agriculture has caused samples of all licensed brands of feeding stuffs to be collected by an agent of the board, and the samples have been duly analyzed at the New Hampshire College Agricultural Experiment Station. Fifty-seven samples have thus been examined, and the results are given in the following tables:

On the whole, the results show a satisfactory condition of the trade in respect to quality, since there are but few serious deficits in the goods as guaranteed.

The prices of some of the feeding stuffs have little relation to their composition, but seem to be governed by what the market will bear. Such a condition can only be remedied by an intelligent study of the different foods.

COMPOSITION OF COMMERCIAL FEEDING STUFFS, 1902.

Brand.	Manufactured by	Sampled at	Protein.		Fat.	
			Guar.	Found.	Guar.	Found.
	Cotton Seed Meal.					
	American Cotton Oil Co.	Colebrook	43.	44.87	9.	8.55
Bluff Mill, Ark.	American Cotton Oil Co.	Lisbon	43.	43.31	9.	9.17
Macon, Ga.	American Cotton Oil Co.	Keene	43.	42.02	9.	10.27
Canary	R. W. Biggs & Co.	Nashua	43.	48.00	9.	9.30
Green Diamond	Chapin & Co.	Claremont	43.	39.82	9.	9.76
Green Diamond	Chapin & Co.	Lakeport	43.	43.00	9.	8.77
Rome, Ga.	Georgia Cotton Oil Co.	Littleton	43.	41.19	9.	9.85
Dixie	Humphreys, Godwin & Co.	Dover	43.	44.93	9.	8.73
	Linseed Meal.					
Cleveland Flax.	American Linseed Co.	Littleton	36.	35.50	2.	1.82
Cleveland Flax.	American Linseed Co.	Claremont	36.	39.69	2.	2.22
Cleveland Flax.	American Linseed Co.	Epping	38.	38.34	1.	2.70
New Process.	American Linseed Co.	Milford	38.	39.40	1.	1.57
New Process.	American Linseed Co.	Lisbon	38.	38.81	1.	2.12
Old Process.	American Linseed Co.	Franklin	32.	32.21	5.	2.30
	Gluten Meal.					
Chicago	Glucose Sugar Refining Co.	Keene	38.	32.69	3.	2.53
Chicago	Glucose Sugar Refining Co.	Nashua	.....	35.10	.....	2.10
Cream	Chas. Pope Glucose Co.	Franklin	34.	44.93	8.2	5.58
Atlas	Not given	Epping	.....	33.34	.....	13.60
	Gluten Feed.					
Buffalo	Glucose Sugar Refining Co.	Dover	28.	25.82	3.	3.58
Buffalo	Glucose Sugar Refining Co.	Dover	.....	24.83	.....	2.44
Globe	New York Glucose Co.	Lakeport	27.50	25.27	3.38	2.40
Pekin	Not given	Nashua	.....	27.11	.....	1.97
	Mixed Feed.					
Buckeye Wheat	American Cereal Co	Claremont	17.75	17.50	4.7	4.89
Snowflake	Lawrenceburg Roller Mills Co.	Milford	.....	16.90	.....	4.68
	Dairy Feed.					
Quaker	American Cereal Co.	Dover	14.	13.32	3.5	3.62
H.-O	H.-O. Co	Concord	18.	17.50	4.5	4.49
	Hominy Meal.					
Unknown		Temple	.....	11.76	.....	9.45
Green Diamond	Chapin & Co.	Nashua	11.	9.65	8.	7.52
	Oat Feed.					
Vim	American Cereal Co.	Claremont	7.5	7.00	2.75	3.70
Royal	Great Western Cereal Co.	Franklin	7 58	6.23	2.65	2.42
Boston	J. E. Soper & Co.	Lebanon	6.97	6.84	2.83	1.90
	Corn and Oat Feed.					
Victor	American Cereal Co.	Claremont	9.	8 66	4.	4.04
Victor	American Cereal Co.	Nashua	.....	9.30	.....	3.00
Boss	Great Western Cereal Co.	Nashua	.....	8.16	.....	6.26
Durham	Great Western Cereal Co.	Franklin	8.27	8.95	3.64	4.89
Haskell's	W. H. Haskell & Co.	Lisbon	12.	9.38	6.25	6.53
H.-O. Horse	H.-O. Co	Concord	12.	11.81	4.5	4.25
H.-O. Horse	H.-O. Co	Portsmouth	12.	14.40	4.5	4.05

COMPOSITION OF COMMERCIAL FEEDING STUFFS, 1902.—*Concluded.*

Brand.	Manufactured by	Sampled at	Protein.		Fat.	
			Guar.	Found.	Guar.	Found.
	CORN, OAT, AND BARLEY FEED.					
Schumacher's Stock.	American Cereal Co.	Portsmouth	10.7	11.58	3.3	4.50
	POULTRY FOODS.					
American	American Cereal Co	Dover	14.	13.75	4.5	6.21
American	American Cereal Co	Laconia	.....	15.01	.....	6.30
*Poultry and Swine	Jos. Breck & Sons	Dover	.....	32.21	.....	10.40
H.-O	H.-O. Co	Keene	17.	17.94	5.5	5.44
H.-O	H.-O. Co	Portsmouth	17.	19.48	5.5	4.61
†Page's	C. S. Page	Littleton	25.	27.75	10.	9.39
†Page's Perfected	C. S. Page	Littleton	.....	30.62	.....	4.52
	MEAT AND BONE MEALS.					
Bradley's Meat.	American Agri. Chemical Co	Dover	40.	49.00	8.	11.12
Meat and Bone (Star)	Beach Soap Co	Keene	30.	31.50	10.	10.61
Beach's Bone	Beach Soap Co	Lebanon	.....	24.40	.....	7.30
Meat and Bone.	Beach Soap Co	Laconia	30.	23.96	10.	8.85
Animal	Bowker Fertilizer Co	Keene	30.	37.62	5.	10.74
Animal	Bowker Fertilizer Co	Littleton	.....	39.05	.....	8.70
Bradley's Meat.	Bradley Fertilizer Co	Littleton	40.	41.77	8.	7.60
Page's Bone	C. S. Page	Littleton	.....	24.31	.....	9.85
Beef Scraps	Bowker Fertilizer Co	Portsmouth	30.	53.97	20.	14.25
	PATENTED FOODS.					
Blatchford's Calf Meal	J. W. Barwell	Keene	26.	25.37	5.	4.51
Blatchford's Calf Meal	J. W. Barwell	Lebanon	.....	25.71	.....	4.82

* An animal meal.

† Coarse raw bone.

FRED W. MORSE,
Chemist.

STATE OF NEW HAMPSHIRE.

CHAPTER 35, SESSION LAWS OF 1901.

AN ACT TO REGULATE THE SALE OF CONCENTRATED COMMERCIAL FEEDING-STUFFS.

SECTION 1. Every manufacturer, company, or person, who shall sell, offer, or expose for sale or for distribution in this state any concentrated commercial feeding-stuff used for feeding farm live-stock, shall furnish with each car or other amount shipped in bulk and shall affix to every package of such feeding-stuff, in a conspicuous place on the outside thereof, a plainly printed statement clearly and truly certifying the number of net pounds in the package sold or offered for sale, the name or trademark under which the article is sold, the name of the manufacturer or shipper, the place of manufacture, the place of business, and a chemical analysis stating the percentages it contains of crude protein, allowing one per centum of nitrogen to equal six and one fourth per centum of protein, and of crude fat, both constituents to be determined by the methods prescribed by the association of official agricultural chemists. Whenever any feeding-stuff is sold at retail in bulk or in packages belonging to the purchaser, the agent or dealer, upon request of the purchaser, shall furnish to him the certified statement named in this section.

SECT. 2. The term "concentrated commercial feeding-stuffs," as used in this act, shall include linseed meals, cottonseed meals, pea-meals, cocoanut meals, gluten meals, gluten feeds, maize feeds, starch feeds, sugar feeds, dried brewer's grains, malt sprouts, hominy feeds, cerealine feeds, rice meals, oat feeds, corn and oat chops, ground beef or fish scraps, mixed feeds, and all other materials of similar nature; but shall not include hays and straws, the whole seeds nor the unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat and broom corn; neither shall it include wheat, rye, and buckwheat brans or middlings, not mixed with other substances, but sold separately, as distinct articles of commerce, nor pure grains ground together.

SECT. 3. Before any manufacturer, company, or person shall sell, offer, or expose for sale in this state any concentrated commercial feeding-stuffs, he or they shall, for each and every feeding-stuff bear-

ing a distinguishing name or trademark, file annually during the month of December with the secretary of the board of agriculture a certified copy of the statement specified in the preceding section, said certified copy to be accompanied, when the secretary shall so request, by a sealed glass jar or bottle containing at least one pound of the feeding-stuff to be sold or offered for sale, and the company or person furnishing said sample shall thereupon make affidavit that said sample corresponds within reasonable limits to the feeding-stuff which it represents, in the percentage of protein and fat which it contains.

Sect. 4. Each manufacturer, importer, agent, or seller of any concentrated commercial feeding-stuffs, shall pay annually during the month of December to the secretary of the board of agriculture a license fee of twenty dollars. Whenever a manufacturer, importer, agent, or seller of concentrated commercial feeding-stuffs desires at any time to sell such material and has not paid the license fee therefor in the preceding month of December, as required by this section, he shall pay the license fee prescribed herein before making any such sale. The amount of license fees received by said secretary pursuant to the provisions of this section shall be paid by him to the treasurer of the State of New Hampshire. The treasurer of the State of New Hampshire shall pay from such amount when duly approved the moneys required for the expense incurred in making the inspection required by this act and enforcing the provisions thereof. The secretary of the board of agriculture shall report biennially to the legislature the amount received pursuant to this act, and the expense incurred for salaries, laboratory expenses, chemical supplies, traveling expenses, printing, and other necessary matters. Whenever the manufacturer, importer, or shipper of concentrated commercial feeding-stuff shall have filed the statement required by section 1 of this act and paid the license fee as prescribed in this section, no agent or seller of such manufacturer, importer, or shipper shall be required to file such statement or pay such fee.

Sect. 5. The secretary of the board of agriculture shall annually cause to be analyzed at the New Hampshire College Agricultural Experiment Station, at least one sample, to be taken in the manner hereinafter prescribed, of every concentrated commercial feeding-stuff sold or offered for sale under the provisions of this act. Said secretary shall cause a sample to be taken, not exceeding two pounds in weight, for said analysis, from any lot or package of such commercial feeding-stuff which may be in the possession of any manufacturer, importer, agent, or dealer in this state; but said sample shall be drawn in the presence of the parties in interest, or their representatives, and taken from a parcel or a number of packages, which shall not be less than ten per centum of the whole lot sampled, and shall be thoroughly mixed, and then divided into two equal samples, and placed in glass vessels and carefully sealed and a label

placed on each stating the name of the party from whose stock the sample was drawn and the time and place of drawing, and said label shall also be signed by the person taking the sample, and by the party or parties in interest or their representatives at the drawing and sealing of said samples; one of said duplicate samples shall be retained by the secretary and the other by the party whose stock was sampled, and the sample or samples retained by the secretary shall be for comparison with the certified statement named in section 3 of this act. The result of the analysis of the sample or samples so procured, together with such additional information as circumstances advise, shall be published in reports or bulletins from time to time.

SECT. 6. Any manufacturer, importer, or person who shall sell, offer, or expose for sale or for distribution in this state any concentrated commercial feeding-stuff, without complying with the requirements of this act, or any feeding-stuff which contains substantially a smaller percentage of the constituents than are certified to be contained, shall, on conviction in a court of competent jurisdiction, be fined not more than one hundred dollars for the first offense, and not more than two hundred dollars for each subsequent offense.

SECT. 7. Any person who shall adulterate any kind of meal or ground grain with milling or manufacturing offals, or any other substance whatever, for the purpose of sale, unless the true composition, mixture, or adulteration thereof is plainly marked or indicated upon the package containing the same or in which it is offered for sale; or any person who knowingly sells, or offers for sale, any meal or ground grain which has been so adulterated unless the true composition, mixture, or adulteration is plainly marked or indicated upon the package containing the same, or in which it is offered for sale, shall be fined not less than twenty-five or more than one hundred dollars for each offense.

SECT. 8. Whenever said secretary becomes cognizant of the violation of any of the provisions of this act he shall prosecute the party or parties thus reported; but it shall be the duty of said secretary, upon thus ascertaining any violation of this act, to forthwith notify the manufacturer, importer, or dealer in writing, and give him not less than thirty days thereafter in which to comply with the requirements of this article; but there shall be no prosecution in relation to the quality of any concentrated commercial feeding-stuff if the same shall be found substantialiy equivalent to the certified statement named in section 3 of this article.

SECT. 9. This act shall take effect December first, nineteen hundred and one.

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